



TENNESSEE VALLEY AUTHORITY BROWNS FERRY NUCLEAR PLANT

FIRE PROTECTION PROGRAM

April 5, 2006



Purpose of Meeting

- Unit 1 Appendix R Inspection
- Review Appendix R Licensing Basis
- How BFN Meets Licensing Basis
- Proposed Resolution



Topics of Discussion

- Description of BFN
- BFN Fire Protection / Appendix R Licensing Basis
- BFN Appendix R Program Methodology
- Unit 1 Modifications
- Approved Appendix R Exemptions for Units 1, 2 and 3
- Principal Manual Action Types
- Long Term Appendix R Compliance Program
- Compliance with 10 CFR 50.48
- Proposed Resolution
- Discussion



Description of Browns Ferry

- All Three BFN Units are General Electric BWR 4 Reactors with Mark I Containments
- Designed and Constructed Materially and Operationally Identical Including Systems, Components, Materials and Environments
- All Units Shutdown March 1985
- Unit 2 Restart 1991, Unit 3 Restart 1995
- Unit 1 on Schedule to Restart May 2007
- Unit 1 to be Restarted Using the Same Programs and Criteria as Units 2 and 3
 - **Maintain Operational Fidelity with Units 2/3**



BFN Fire Protection Program

- 1975 Browns Ferry Unit 1/2 Fire Recovery Plan
- Appendix R Exemptions SE (October 1988)
- SE for Units 1, 2 and 3 addressed the Safe Shutdown System Analysis for BFN including local manual actions for achieving plant shutdown per Appendix R (December 8, 1988)
- Supplemental SE for Unit 2 addressed revised Safe Shutdown analysis for Unit 2 operation only (November 3, 1989)
- SE for Unit 2 approved Appendix R Safe Shutdown program (March 6, 1991)
 - Appendix R Safe Shutdown program License condition added
 - Permitted Changes to Approved Appendix R Safe Shutdown Program without prior NRC Approval if Change does not Adversely Affect the Ability to Achieve and Maintain Safe Shutdown in the Event of a Fire
- Unit 2 Restart – Fire Protection Technical Specifications and Appendix R License Condition



BFN Fire Protection Program

- NRC SER found Unit 1, 2 and 3 Fire Protection Program and Fire Hazards Analysis Acceptable (March 31, 1993)
- License Amendment issued for Units 1, 2 and 3 to incorporate a Standard Fire Protection License Condition and Moved Fire Protection Requirements to Approved Fire Protection Report (April 1, 1993)
- SE for Units 1, 2 and 3 Approved the Unit 2 and 3 Safe Shutdown Capability (November 2, 1995)
 - SER Assumed Unit 1 in Defueled State
 - Revised Program the Same as Approved for Unit 2
- BFN Unit 1, 2 and 3 have Standard Fire Protection License Condition
 - Permits Changes to Approved Fire Protection Program without prior NRC Approval if Change does not Adversely Affect the Ability to Achieve and Maintain Safe Shutdown in the Event of a Fire
 - References Safety Evaluations dated December 8, 1988; November 3, 1989; March 6, 1991; March 31, 1993 and November 2, 1995



BFN Fire Protection Program

- Unit 1 Fire Protection Program Analysis Performed Using Same Methodology as Unit 2/3
 - In Accordance with Regulatory Framework that Established Scope of Unit 1 Project (December 2002)
 - Regulatory Framework Approved by NRC (August 2003)
 - Similar Modifications and Manual Actions Provided
 - Same Shutdown Paths as Unit 2/3
- BFN in Process of Completing Appendix R Modifications to Support Restart of Unit 1 in Early 2007
- TVA to Approve FPR Changes Using Existing License Condition
- NRC Request for Information on Unit 1 Fire Protection Program (January 3, 2006)
- Draft Unit 1, 2, 3 Fire Protection Report Submitted (February 27, 2006)
 - Consistent Program Across All Three Units



BFN Fire Protection Program

- BFN Appendix R Program Methodology
 - Identify required equipment to achieve safe shutdown (SSD)
 - Identify cable routing
 - Perform computer analysis to ensure availability of required SSD equipment for each area
 - Identify failures
 - Fire Induced Spurious Operations
 - Perform modifications to make required SSD equipment available.
 - Prepare manual action calculation to support development of Safe Shutdown Instructions
 - Safe Shutdown Instructions prepared by Operations
 - Validation of Safe Shutdown Instructions
 - Install required emergency lighting



BFN Fire Protection Program

- Unit 1 Modifications
 - Suppression System in Unit 1 Reactor Building
 - Detection System in Unit 1 Reactor Building and Board Rooms
 - Appendix R
 - Cable Wraps – 6
 - Cable Reroutes – 144
 - Circuit Modifications – 26
 - Instrument Loop Modifications – 9
 - Mechanical Modifications – 1
 - Emergency Lighting
- Same Modifications as Previously Performed for Units 2 and 3



BFN Fire Protection Program

- NRC Approved Appendix R Exemptions for Units 1, 2 and 3 (October 1988)
 - Exemption from fixed fire suppression in the control rooms
 - Exemption from automatic fire suppression in RHR pump / heat exchanger rooms
 - Exemption from no intervening combustibles within a 20 foot separation space between redundant safe shutdown system components
 - Exemption to allow water level to momentarily drop below the top of the core
 - Exemption for Control Building fire detection and fixed fire suppression in fire areas for which alternate shutdown capability has been provided



BFN Fire Protection Program

- Principal Manual Action Types (1995 SE)
 - Manual Scram and Vessel Isolation
 - Initiate HPCI and RCIC systems
 - Align Electrical Boards
 - Start EECW pumps
 - Close HPCI steam supply shutoff valve
 - Isolate RWCU
 - Manual Depressurization using MSRVs
 - LPCI Injection for inventory control
 - Initiate RHRSW system to remove decay heat
 - Initiate Ventilation and Cooling of Control Building and Board Rooms
- No new Manual Action Types Added for Unit 1
- Quantity of Manual Actions Typical of BWRs



BFN Fire Protection Program

- Long Term Appendix R Compliance Program
 - Assessment of proposed modifications/design changes to determine impact on existing Fire Hazards and Safe Shutdown Analysis evaluated in accordance with Plant Modifications and Engineering Change Control (SPP-9.3, Appendix C)
 - Changes to Fire Protection Report are prepared, reviewed and approved and impact on Licensing Condition evaluated in accordance with Management of the Fire Protection Report (FPDP-3)
 - Self assessments, Nuclear Assurance audits and NRC Triennial audits review compliance with the Appendix R Licensing Basis
 - Initial Appendix R compliance strategy (Unit 2) underwent significant revalidation due to Unit 3 and Unit 1 restart efforts
 - Any Non-Compliance Issues are Documented in the BFN Corrective Action Program
- BFN Three Unit Appendix R Program Consistent with Licensing Basis and License Condition



BFN Fire Protection Program

- Compliance with 10 CFR 50.48
 - Licensed Prior to January 1979
 - Required to meet Appendix R III.G, III.J, III.L and III.O
 - No commitment to Branch Technical Position (BTP) 9.5-1 “Guidelines for Fire Protection for Nuclear Power Plants”
 - Submitted Comparison to BTP for information with BFN Fire Protection Report (1992)
 - Provided to aid in review of BFN Fire Protection Report
 - NRC SER found Unit 1, 2 and 3 Fire Protection Program and Fire Hazards Analysis Acceptable (March 31, 1993)
 - License Amendment issued for Units 1, 2 and 3 to incorporate a Fire Protection License Condition (April 1, 1993 and November 2, 1995)
 - Permits changes without NRC approval if the change does not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire
- BFN Three Unit Appendix R Program Consistent with Licensing Basis and License Condition



BFN Fire Protection Program

- Proposed Resolution for Unit 1 Restart (Early 2007)
 - Complete Unit 1 Appendix R Modifications
 - TVA Approve FPR Changes Using Existing License Condition
 - Restart Unit 1 with Same Fire Protection Program as Unit 2/3
 - Maintain Operational Fidelity with Units 2/3
- Evaluate Post-Fire Operator Manual Actions in Accordance with NRC Guidance to Industry (March 6, 2006 Federal Register Notice)
- Evaluate Post-Fire Spurious Actuations in Accordance with Regulatory Issue Summaries 2004-03 and 2005-30 and Subsequent NRC Guidance